PRIDE OF SOUTH AFRICA

GEMSTONES

JENNIFER STODEL · PAT SYDIE

PURNELL

Faceting is the most complicated operation carried out by the lapidary, and stones need careful study through the lapidary's magnifying loupe before and during the cutting.

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JENNIFER STODEL

PAT SYDIE
PHOTOGRAPHER

ADDITIONAL PHOTOGRAPHS BY
HUMPHRY CLINKER

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FRONT COVER: Blue lace agate, the pride of Namaqualand which is South Africa's richest source of gemstones.

BACK COVER: Amethyst's value increases with the depth of its colour, varying through bluish-violet to deep purple.

Chalcedony is really a whole family of gemstones, but in South Africa the term is reserved for the attractive translucent blue variety found in the Natal Drakensberg and near Okahandja in South West Africa.

SEEN from space, planet Earth is a fragile-looking little ball of blue. Astronauts' photographs have made it all too plain how tiny it is in comparison with the vastness of the universe. Yet somehow that only makes it all the more wonderful.

At the time the first spacecraft were probing the moon, an American prospector named George Swanson was scouring Namaqualand for precious stones. By extraordinary coincidence he stumbled upon a deposit of a new blue agate previously unknown, delicately laced with lavender seams. Polished, the stone looked exactly like the little blue ball in the astronauts' photographs. Today, George Swanson's agate has been adopted in America as a symbol of world ecology: a reminder of how extraordinary it is that such a diminutive planet could support such amazing life, and an encouragement to take proper care of it.

That space-blue agate is the world's latest gemstone, the most recent in a line that stretches back to man's origins in the aeons of pre-history. Indeed, it was here long before his ancestors took their first stumbling steps; and not inconceivably, if man continues to abuse his home as he has been doing, it will still be here to watch as life exterminates itself.

Tumble polishing is the simplest form of lapidary work. The idea is to simulate the effect of abrasion on sea pebbles, which rub against each other until they are perfectly smooth.

A favourite treatment for opaque gemstones is the cabochon cut. The lapidary cuts his raw material into blanks, then grinds these into shape and carefully sands and polishes them.

Tiger's eye occurs in a variety of colours. A blue version is known as bull's eye, unique to South Africa.

When golden tiger's eye is exposed to heat treatment it turns an attractive brick red.

First step in cutting a cabochon is to reduce the gemstone material to small cubes.

depends on the public at large.

FASHION: what was considered attractive yesterday may not be fashionable today. For example, in the nineteenth century opal lost its popularity when Sir Walter Scott's *The Talisman* linked an opal with tragedy. However, Queen Victoria later restored the luckless stone to favour when she took to wearing opal set jewellery.

SIZE: big size is symbolic of wealth and position, though the price demanded per carat for the biggest specimens may be less than for smaller stones – except with diamonds, of course.

LUSTRE, which depends on the speed that light passes through the stone. If the light is slowed down there is a slight change too in its direction, which is known as 'refraction' and may be measured. The value obtained from this measurement is known as the 'refractive index', and the greater the refraction, the brighter the gemstone. For instance, glass has an RI of 1,6 and diamond of 2,4.

The extraordinary increase in the popularity of gemstones in recent years is the result of two related factors. One is the great rise in the number of gemstone hobbyists – for instance, in the United States the number of hobbyists rose from 309 000 in 1965 to more than 3 million by 1970 – which may be attributed to the attention paid to ecology movements; and the other is the resulting scarcity of raw materials.

Gemstone dealers in the United States buy 240 different types of gem and decorative stone from different parts of the world – many of course belonging to the same families – and of these South Africa provides twelve. Many more varieties are available in South Africa, but not in sufficient quantity for export; or rather, in many cases of insufficient quality to compete with material imported from other sources. Certain countries, then, are highly regarded as sources of particular stones. Thus Australia is known for opals and blue sapphires; India for moonstone and bloodstone; Zaire for malachite; Brazil for aquamarines and citrines and topaz; Mexico for onyx and fine and crazy lace agates.

In southern Africa, Mozambique is noted for tourmalines; Angola for sodalite; Rhodesia for amazonite, thulite and matorolite; Botswana for pink and grey agates; and South and South West Africa for amethyst, rose quartz, amazonite, poppy jasper, blue lace agate, unicite, and grossular garnet – and, of course, diamonds. And South Africa alone has tiger's eye.

PROSPECTING AND MINING

No large mining houses are involved in South Africa's gemstone industry, except in the cases of diamonds and emeralds. That means that there is unusually

large scope for the individual prospector, amateur or professional, who has every chance of stumbling upon an important and invaluable deposit which he will himself be able to exploit.

The prospector must be equipped with an appropriate licence, and must show this to the owner of whatever private land he wants to prospect. Then it is for him to carry out a systematic investigation until he finds what he considers is a workable deposit. Interestingly, many of the most successful prospectors are Africans, who seem to have an innate talent for locating mineral and gemstone deposits even though they had no formal scientific training. They sometimes go into a sort of trance and talk to the rocks, trying to persuade them to yield up their secrets.

The prospector pegs and registers his claim, then digs down to begin work. The gemstones may be recovered from small pits sunk in gem-bearing gravel deposits, or from short tunnels and shafts in hard rock. Pit and shaft sinking involves a great deal of labour and considerable cost, and is a risky operation in that there is no telling if it will prove worthwhile.

In a really big operation, the overburden of ground is blasted away to reveal the gem-bearing levels beneath. The gems are found in matrix, a conglomeration of adjacent ground, and this must be hammered or cobbed – an operation which requires considerable skill. The specimens are then sorted and graded according to quality.

In nearly every gemstone deposit the truly useful material is a very small percentage of the whole. In order to make mining profitable, miners either lump all the production into a 'mine run lot' containing all grades from bad to good, and sell the lot *in toto*; or they grade the production at the mine and sell smaller lots at prices adjusted according to quality.

The drawback of the first scheme is that very few buyers are able to pay for and dispose of large mine run lots, which means miners may have to wait a discouragingly long time before a customer comes along.

In the second case, on the other hand, the buyers are eager to take top quality material, but reluctant to deal in lesser grades. This often means that mines are stuck with a considerable quantity of unsaleable gem rough which costs as much to recover as the best grades. The answer is to peg prices on readily saleable grades so high that at any rate costs are recovered. Any further sales of poorer grades will then be pure profit.

Some miners have little knowledge of how to grade gemstones, or else find it too much trouble. Either way they may lose a considerable amount of money. For example, a mine may sell 20 tons of rough amethyst for R8 000; whereas if this was graded by experts and then sold selectively, the same quantity might fetch R25 000 or even more.

THE FIELD BUYER

The field buyer has his office in a large city with export facilities, and sends agents into the field to buy directly from the miners. Once he has bought the stones he has a problem: should he sell his purchases 'as is', or should he classify the rough into parcels of various grades?

Some gem material, the kind that comes in a mass, can be sold in the same condition as it has left the mines. Amazonite, rose quartz, sodalite and jasper fall into this category. Quartz too needs minimal sorting, for it is remarkably consistent. But in the cases of most kinds of gemstone the experts have to go over each individual piece before they may export any of it or offer it for sale. They distribute the different qualities in the following categories or 'parcels': Top quality facet material; lesser quality facet material (poorer in colour or containing flaws); cabochon or carving material; specimen material; and waste.

SOUTH AFRICA'S OUTSTANDING STONES

Most gemstones are simply varieties of well-known, quite commonplace minerals. Tiger's eye, agate, amethyst, chalcedony, jasper and citrine are varieties of quartz; ruby and sapphire of corundum; aquamarine, heliodor, morganite and emerald of beryl; and amazonite and moonstone of feldspar. South African jade is a type of garnet, verdite is a sort of serpentine, unakite is granite, and tourmaline is chiefly aluminium.

Tiger's eye is crystallised quartz, in most cases derived

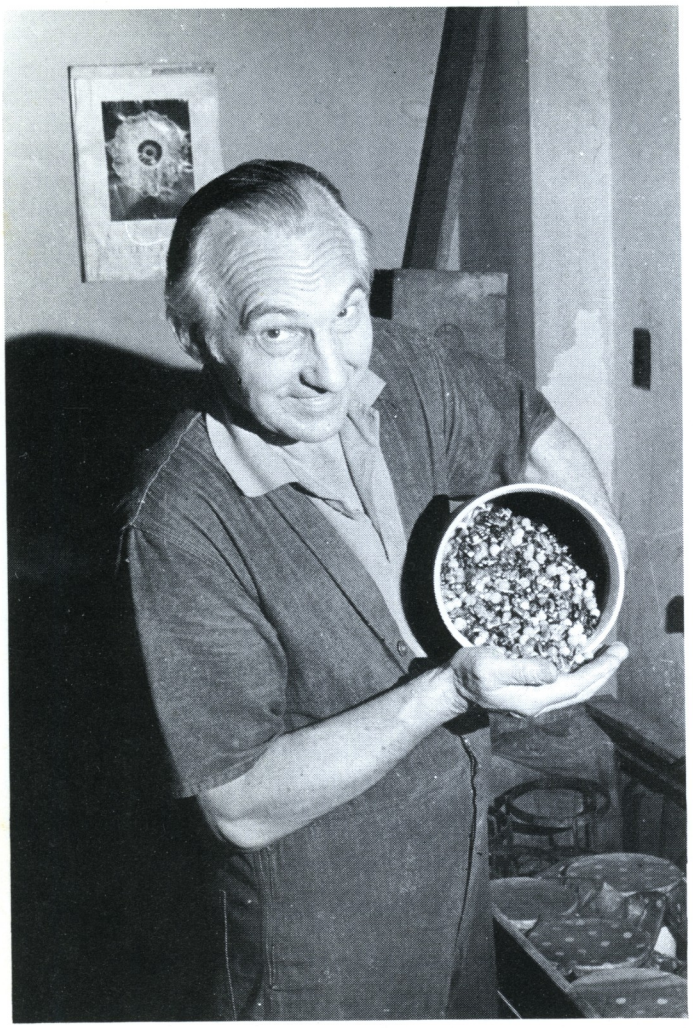
The lapidary grinds the gemstone cube ready for the cabochon cutter.

Agate is a variety of chalcedony and occurs in many forms. It may be polished in a variety of shapes, and is ideal for jewellery.

Banded agates come in endless permutations of colour and formation. The one consistent factor is that no two are the same.

The most popular gem jasper is the distinctive red 'coral' jasper found in the northern Cape and elsewhere. The material is not hard, but takes a high polish.

Chrysoprase is a variety of chalcedony, another member of the quartz family. The colour comes from the presence of nickel oxide.



The simplest form of lapidary work is tumblestone polishing, in which stones are rotated in a barrel filled with grit.

from crocidolite: an asbestos mineral which has oxidised to a golden brown and then been replaced by silica. This means that when the stone is polished it appears to change colours in bands ranging from pale gold to dark brown, which seem to ripple across the surface of the stone. Though *golden* tiger's eye is best known, it sometimes occurs as a combination of blue-green and gold. When subjected to heat treatment, golden tiger's eye goes a deep brick red.

Dealers say that tiger's eye is the bread-and-butter of the gemstone industry, a stone which is ideal for a great range of jewellery pieces and ornaments. Of several variations, the most important are known in the trade as *bull's eye* (blue); *cat's eye* (bluish to greyish yellow); *hawk's eye* (greyish green); and *zebra's eye* (yellow and green).

The stone is unique to South Africa, and there are deposits in many parts of Griqualand West, which is known for blue asbestos; and in the banded ironstone of the Transvaal System of Prieska and Hay in the northern Cape, particularly near the village of Niekerkshoop, and north of Prieska. The deposits appear to be plentiful, and will last for many years to come – particularly since the South African government's decision to ban the export of rough tiger's eye, which has been effective since 1971. This has resulted in a sharp rise in the value of the stone, as overseas dealers' stocks have shrunk.

Chalcedony is a cryptocrystalline variety of quartz with a waxy lustre, appearing in a variety of colours. Though agates, carnelians, jaspers, onyx and other gemstones are really chalcedonies too, South Africans usually reserve the term for the attractive, translucent blue variety found in the Natal Drakensberg and near Okahandja in South West Africa.

Carnelian is translucent chalcedony, coloured bright red to brownish red, or in its yellowish to reddish brown varieties known as sard. Both are found in the alluvial gravel in the districts of Hay and Prieska in the northern Cape, and also along the Vaal River and its tributaries.

Heliotrope or **bloodstone** is opaque, dark green chalcedony shot through with specks of red jasper. It is found with the lenticular bodies of jasper in the Ongeluk lava of Griqualand West, and in the alluvial gravel derived from these rocks. Chrysoprase is an opaque, apple-green variety of chalcedony. The colour comes from the presence of nickel oxide.

Agate is another variety of chalcedony and occurs in all sorts of varieties. It seems no two agates are ever alike – whether in colour, pattern, shape or design; and it has been a popular gemstone since the days of the ancient Greeks. Found in every continent, agates vary greatly in size from tiny nodules weighing only a fraction of an ounce, to boulders of several hundredweight.

Scientists have been rather puzzled by the ways in which an agate is formed: but the most simple explanation is that steam cavities in lava were filled with colloidal silica which percolated through the rock, depositing particles on the wall of the cavity. In turn, other mineral-bearing solutions passed through the silica layer, forming the coloured bands which are a feature of many varieties of agate. The main types are:

fortification agate, in which the colours form bands which when the stone is cut, show a marked similarity to the plan view of the Iron Age camp or fortress, as the bands are irregular and sharply angled;

moss agate or *mocha stone*, where fern or moss-like inclusions in clear agate, due to the colloidal precipitation of manganese oxide in the silica, give the appearance of plants or feathers enclosed within the stone. Some varieties are termed *plume agate* or *flower agate;*

banded agate, where the layers of colour, sometimes in great contrast, are fairly even and concentric.

Agates of various colours, but usually small dimensions, are common in the residual soil and alluvial gravel derived from the amygdaloidal volcanic rocks of different ages which are found in various parts of South Africa – notably the Drakensberg volcanics in portions of Natal, the Free State and Lesotho, on the Springbok flat in the central Transvaal, and along the Lebombo mountains; in the Ventersdorp and Ongeluk lavas in parts of the south-western Transvaal and Griqualand West; and the lavas of the Mozaan Formation in northern Natal, Zululand and south-eastern Transvaal.

Jasper, yet another variety of chalcedony, is opaque and usually red in colour though also yellow, brown, dark green or greyish blue – usually impure, and often marked with broad, parallel bands. Yellowish-brown and brownish varieties are found in practically unlimited quantities in the Prieska, Hay and Kuruman districts; but it is the 'coral' red and 'fancy' brecciated or speckled, mottled varieties that are popular as gemstones. Again these are found in the northern Cape, particularly near Postmasburg and Olifantshoek. In its brecciated form, jasper is often termed zylite. The material is not hard, but is tough and takes and preserves a high polish.

Onyx resembles agate in every respect, except that the bands of coloured material are alternately black and white, straight and parallel. **Sardonyx** is made up of bands of carnelian or sard, interspersed with bands of white chalcedony. Examples of both onyx and sardonyx are to be found in the diamondiferous gravel along the Vaal and its tributaries.

Amethyst is crystalline quartz, varying in colour from the almost colourless through bluish-violet to deep purple. Value increases with the depth of the colour. Amethyst is found in the ancient granites north of Johannesburg, specially near the Jukskei river and the Hennops river south-west of Pretoria. Amethystine quartz and rock crystal are found in the Witwatersrand gold mines.

Other localities in which amethyst is found are Namaqualand (on Vuurdood mountain near Goodhouse and in the vicinity of Keimoes); in the northern Cape (near Kakamas and Postmasburg); in the northern Transvaal; and in South West Africa (Klein Spitzkoppe and east of Okaputa in the Grootfontein district).

Closely related to amethyst is **citrine,** also known as false topaz through its similar colour: light golden-yellow to reddish-yellow, through the presence of iron, and once subject to tremendous heat. Indeed, artificial citrine is produced by heating ordinary amethyst. Excellent material is found in the vicinity of Klein Spitzkoppe in South West Africa.

Rose quartz is straightforward quartz bearing traces of titanium, which colour it rose-pink to rose-red. Quartz itself is an oxide of silicon, and is one of the commonest minerals. Rose quartz's value as a gemstone depends on the depth of the colour, and it may be translucent or opaque. It is usually associated with granite, and occurs in the northern Cape, Namaqualand, northern Transvaal and northern Natal. Very rarely is it found without flaws – to the gratification of the French, who prefer their gemstone 'scarred' so that they can see they are not synthetic imitations.

An ingenious tumblestone wheel utilises the movement of a stream.

'Rock-hounds' appreciate the surprise when they chip open an amethyst 'egg' and discover the crystal formation inside.

Citrine is closely related to amethyst, and through its similar colour (light golden-yellow to reddish-yellow) is sometimes termed 'false topaz'. Real topaz is on the left.

A variety of quartz is rose-coloured, through the presence of titanium. It may be translucent or opaque.

The lapidary marks the shape of a cabochon on a slab of gemstone material.

Green quartz, less common than the rose varieties, gets its colour from the presence of chrome muscovite. It is found near Soutspansberg in the Transvaal.

Pure transparent **corundum** is a precious stone and occurs in several colours. Red corundum is known as **ruby**; blue as **blue sapphire**; colourless as **white sapphire.** Precious stones with internal reflections as the result of air bubbles are known as star sapphires. The red colour of ruby comes from chromium, and the blue of sapphire through oxides of iron and titanium. Gemstone material is relatively scarce, but there are deposits in Namaqualand (pink, yellow and dark red) and the northern Transvaal.

Emerald ranks with the ruby and the diamond as the most precious of gemstones. Emerald is a form of beryl crystal, and this material is found at several localities a few miles south-east and east of Gravelotte in the Letaba area, north-eastern Transvaal; in northern Namaqualand, near Baviaanskop; and near Schweizer-Reneke in the Transvaal. The emeralds occur in biotite schist at or near contacts with the pegmatite bodies.

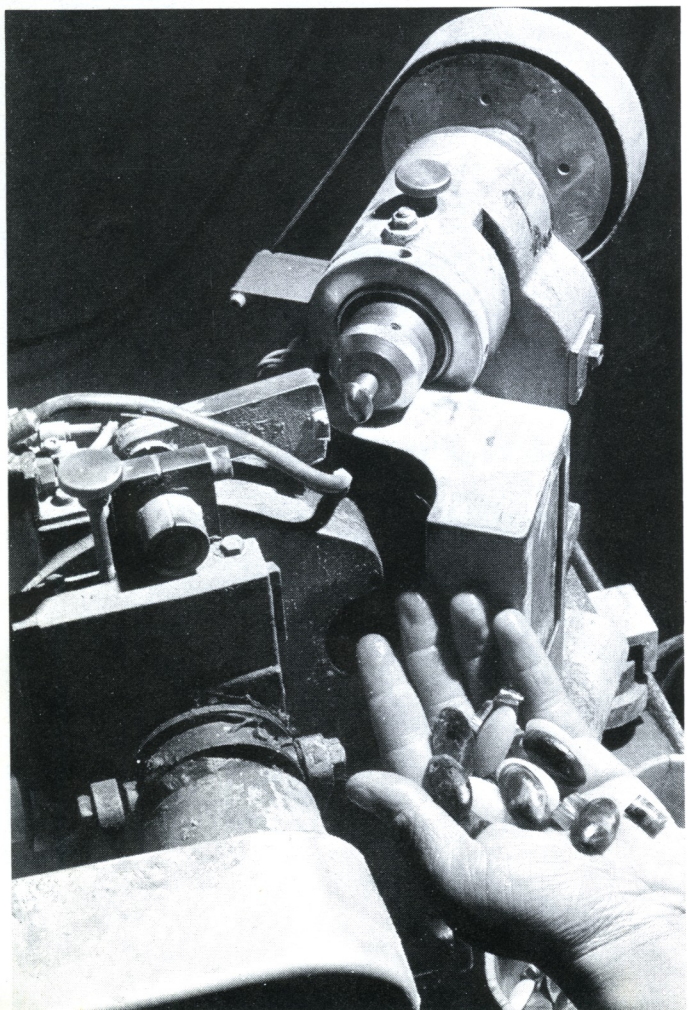
The crystals of emerald are hexagonal and prismatic and range in size from 26 centimetres long down to crystals which can be traced only with a microscope. Most are enclosed in a sheath of biotite flakes and may range in colour from light green through every shade to dark green. The exceptionally large crystals are usually composed of a core of non-precious beryl enclosed by a thin layer of emerald.

Most of what is mined as emerald is of inferior quality, and the few good crystals may be spoilt by explosives. Some of the crystals of good colour may be cracked or otherwise flawed. But many contain pieces of transparent emerald, from which stones weighing up to 10 carats may be cut.

The emeralds are recovered by careful hand-cobbing from the broken emerald-bearing rocks. African workers sort out the crystals of good colour, and then expert sorters classify them in their different grades. The best stones are suitable for facet cutting, while flawed crystals of good colour are saleable at much lower prices. These last are generally cut in cabochon, and are used for less expensive items of jewellery.

Other gemstones in the beryl family found in South and South West Africa include **aquamarine,** which is clear sky-blue, bluish- green or clear green, in large crystals of flawless clarity. It is found in the pegmatite areas of northern Namaqualand and South West Africa and especially near the Klein Spitzkoppe; and also in the Lowveld of the eastern Transvaal, near Gravelotte; the golden yellow heliodor; and the pink morganite or vorobyevite, rich in sodium and caesium.

Pre-eminent among gemstones is the **diamond,** of which South and South West Africa hold the world's most important reserves. In spite of all the mystique



Cabochon cutting, the most popular method of gemstone production in South Africa.

that surrounds it, diamond is nothing more than a form of crystallised carbon, produced under enormous heat and pressure. Alluvial deposits of diamonds are found in the northern Cape, the western Transvaal and on the Atlantic coast at the mouth of the Orange river; and there are a number of diamond-bearing volcanic pipes in the area of Kimberley, in the Free State and at Cullinan near Pretoria (for more detailed information, see *Pride of South Africa: Diamonds*, by Anthony Hocking).

Amazonite, or massive microcline feldspar, is ideally an attractive green with occasional white flecks. It is found in the Pietersburg district of the Transvaal, and is mined at Pofadder in Namaqualand and in South West Africa. Ideally suited for jewellery and very popular, amazonite is cut in cabochon or baroque forms, and used ornamentally.

Other gemstone feldspars include **moonstone,** which has a very pale flesh-colour, with an opaline light reflection or a delicate iridescence; and **sunstone,** a variety of aventurine, which is similar but reddish, with bright yellow or reddish reflections from flakes of iron oxide which are enclosed. Both have been found in the granites of the northern Transvaal.

Sodalite is related to feldspar, a vitreous blue colour interlaced with a colourless streak. It is found in the northern Cape and in South West Africa. **Aventurine** may be white or green, but is usually light green with a vitreous lustre.

Garnet is the name for a whole family of minerals, not merely the dark red stone popular in Victorian jewellery. It occurs in both crystalline and massive forms, of which the most important are:

pyrope (magnesium/aluminium garnet), the best for gemstones, deep crimson in colour. It is also known as 'Cape ruby', and occurs in Namaqualand and near Walvis Bay, South West Africa;

almandite (iron/aluminium garnet), dark red and reddish-brown, with well-formed crystals or massive lumps found in schist and pegmatite. It occurs in several localities in the Soutpansberg district of the northern Transvaal;

grossularite (calcium/aluminium garnet), green to greenish yellow brown to reddish orange, mainly translucent and very rough. The green, compact variety is known in South Africa as **jade,** and possesses all the qualities of a gemstone and has been well suited for jewellery. It is found in areas 64 km west of Pretoria, and occurs in bands up to 45 cm thick, associated with the gabbro of the Bushveld Igneous Complex.

Other varieties are:

spessartite (manganese/aluminium garnet), a rarer variety, deep hyacinth to brilliant orange and red; *andradite* (calcium/iron garnet), transparent, usually a shade of green; and *uvarovite*, an emerald-green garnet usually associated with jade.

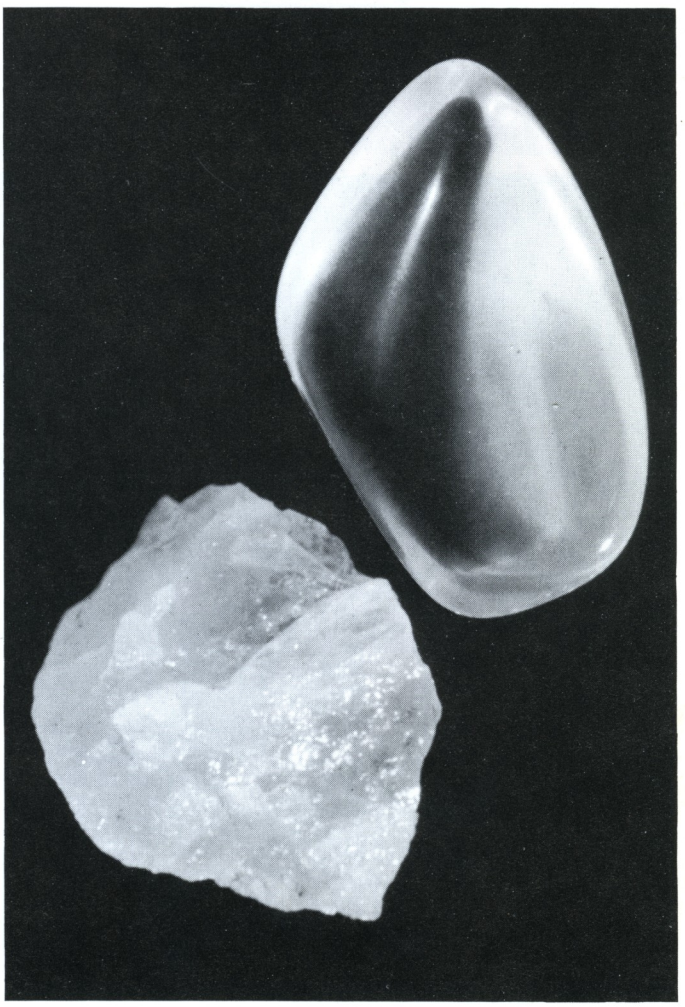
Tourmaline is common in nearly all granite localities, and can easily be recognised by the striations along the crystals. This stone is an extremely complicated bor-silicate of various metals, and the complex chemical composition accounts for the magnificent range of hues in which tourmalines are found. The *pure* tourmaline is colourless and is then termed achroite. *Schorl* or *black tourmaline* is the commonest kind and is coloured by iron; the blushing pink *rubellite* by lithium; and *brown tourmaline* by magnesium. Other types are *indicolite* (dark blue); *siberite* (dark violet); *green tourmaline; yellow tourmaline;* and *blue tourmaline*. Some tourmalines show more than one colour in the single stone, and many seem to change colour altogether when examined from different angles.

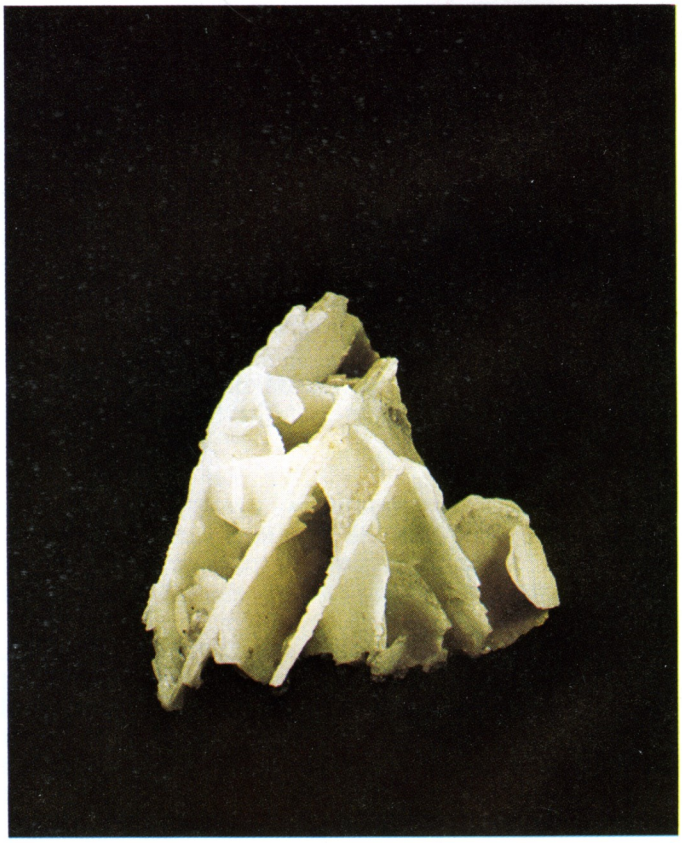
Though tourmaline itself is fairly common, *gem* tourmalines are restricted to a few areas. Green tourmaline of good quality is found in the northern Cape at Straussheim in the Kenhardt district, as well as in the Keimoes area. In South West Africa green, blue and pink tourmalines occur in the pegmatites near Usakos, as well as elsewhere in the vicinity: notably on the Davib, Camdroon and Carsie mines.

Verdite is a variety of serpentine, and deposits near Noordkaap in the Barberton district have been worked for many years. It is a very beautiful stone of brilliant dark green which occurs in thin bands in ultrabasic rocks of the Jamestown district, sometimes intergrown with grey talc.

True verdite is soft and easily worked, but it varies greatly in quality. In places it is intergrown with hard corundum-bearing rocks of equally good colour, but

Smokey quartz is a variety of one of the commonest of minerals. It is usually associated with granite formations.





Amazonite, or massive microcline feldspar, is ideally an attractive green with occasional white flecks.

Unakite is a member of the granite family.

Thulite is calcium aluminium silicate and has vitreous lustre.

A fine collector's piece is this delicate cluster of gypsum crystals.

A gemstone increasingly popular is aragonite, a calcium carbonate which is usually colourless or white though it may have a slight tint.

Three stages in producing a necklace. The lapidary grinds beads (left) and pierces them (centre). The girl threads the beads on to string.

more difficult to extract. The stone is available in comparatively small sizes, though pieces weighing up to 230 kilos have been recovered.

Fluor-spar or fluorite comes in a variety of colours, mainly purple, green, blue or light red, as well as colourless. It is found widely spread in South Africa, particularly in the granitic rocks of the western and central Transvaal; and near Hlabisa in Zululand.

Other South African gemstones which have found increasing favour in recent years include **aragonite,** a calcium carbonate with vitreous lustre, colourless or white though often with a tint and a colourless streak; **thulite,** which is calcium aluminium silicate coloured red with a white streak and vitreous lustre; and **unakite,** pink and green and a member of the granite family.

LAPIDARIES

According to the dictionary the lapidary is 'one engaged in the cutting and polishing of stone'. On this basis the original lapidary must have been the first of our primitive ancestors to discover that a piece of rock shaped as a tool can be more effective than a mere 'blunt instrument'. However, that primitive ancestor would be most surprised to discover the tricks of his modern successors. And he would be surprised too to realise the strange uses to which his 'shaped stones' are being put.

Many professional lapidaries are former hobbyists who have turned their leisure interest into a full-time business. Others have taken formal training in the arts of cutting and polishing, perhaps at Idar Oberstein in West Germany, which is the world's leading centre. In South Africa there are no formal training schools, but the owners of lapidaries themselves train their employees. The local industry was greatly boosted by the arrival of a number of skilled German craftsmen in the years after World War II.

The three chief means of cutting and polishing gemstones are:

Tumble polishing, the simplest form of lapidary work, and suitable for both translucent and opaque stones. The idea is to stimulate the effect of abrasion on sea pebbles, which rub against each other until all their corners and rough edges are removed and they become perfectly smooth. In tumble polishing the stones are tipped into barrels which are rotated at constant speed over a long period. To assist the grinding process the lapidary adds coarse grit for the first 48 hours; a less coarse for the next 48 hours; a fine grit for the next, and so on until all the rough edges have been ground away. The stones are carefully washed between each process, and at the end a polishing agent is added to bring up a high sheen.

Cutting a cabochon, used mainly for opaque stones which are in most cases cut from large chunks of mineral. First the raw material is carefully studied, then cut into slabs with a diamond tipped circular saw, and cut into rectangular or square blanks. The outline required is drawn on, then the blank is glued on a dopstick and ground down to size. The finished cabochon is sanded and polished and removed from the dopstick.

Cutting facets, used mainly for translucent gemstones, and the most complicated operation carried out by the lapidary. Facetting involves creating a number of highly polished plane surfaces from which rays of light are reflected. These give fire and brilliance to stones which in their natural state may well seem devoid of colour or interest. The facets are cut sym-

metrically round the surface of the gem at specific angles which vary according to the refractive index of the stone. Stones often need a good deal of study before the lapidary sets to work on this highly critical operation.

JEWELLERY

The best way to show off a polished stone is to mount it in gold, platinum or silver, or some non-precious metal like copper, aluminium or stainless steel. A great range of 'findings' or mountings like brooch backs, cuff link fittings, ring shanks and ear clips are available mass-produced; while on a more sophisticated level there is no limit to the range of setting designs possible, whether classical or modern.

There are several points to be borne in mind when handling and caring for gemstones:

Be careful not to scratch them, for many are extremely brittle and can be damaged even by a fingernail. In particular, *do not allow different articles of jewellery to touch each other*. Diamonds, rubies and sapphires are extremely hard, and will soon scratch other stones with which they are in contact. Diamond even cuts diamond, after all. Keep softer gems clean of dust, as even this may have an adverse effect.

Never drop or hit gemstones, as they may fracture. Topaz, fluorspar and kunzite are especially vulnerable, and even diamond will shatter when hit from a particular angle.

Choose the right stone for the right setting, in particular *hard* stones for rings. Softer stones may be used in pendants or earrings where there is less chance of damage.

Remember each stone has special character, and needs individual care. For instance, keep dirty water, soap, detergents, solvents and liquids away from porous gems like turquoise, opals and pearls, as it changes their colour. And once a year soak valuable opals in colourless oil, since at high altitudes they are liable to crack unless this is done.

COLLECTING AS A HOBBY

Archaeologists have shown that man has been interested in gemstones from the very earliest times. But the practice of forming organised collections is only 300 years old, initiated from the time European universities became interested in the new sciences of mineralogy and crystallography. By the 1850s many a gentleman of leisure had his private collection of specimens; and when home lapidary equipment became freely available in the 1930s, the hobby expanded to include do-it-yourself cutting and polishing.

Today there are between 7 and 10 million gemstone hobbyists in the world, a great many of them belonging to the more than 1 000 gem and mineral clubs formed in various countries – among them the Mineral Association of Southern Africa.

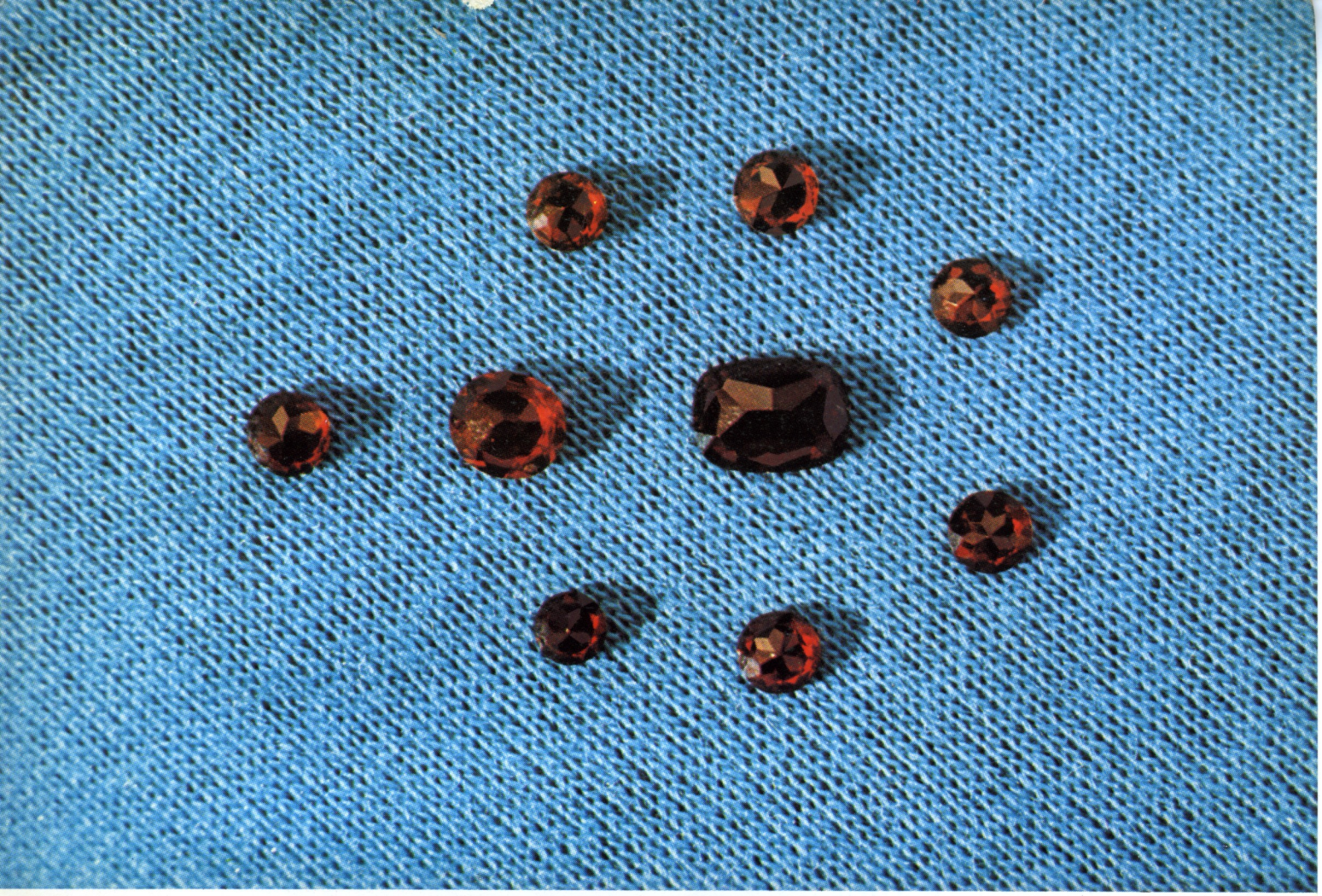
Few of these hobbyists have had any formal training; but they are all interested in the earth sciences as a valuable diversion from the pace of everyday life, and as a stimulating source of mental activity. Some spend great sums in acquiring new specimens for their collections; others prefer to spend practically nothing, and instead rely on their own initiative in finding

Faceting involves the creation of a number of highly polished plane surfaces from which rays of light are reflected. The lapidary first examines the stone with a magnifying loupe (above).
He then mounts the stone on a dobstick to be ground on a rotating wheel.

Aquamarine may be clear sky-blue, bluish-green or clear green as above, in large crystals of flawless quality. It is a member of the beryl family, found in the northern Cape and eastern Transvaal.

Garnet is a whole family of gemstones, but most familiar are the crimson pyropes which were popular with Victorians.

Morganite or vorobyevite is a variety of beryl, rich in sodium and caesium.



specimens in the course of field expeditions. But all are agreed that the most satisfying aspect of the hobby is the pursuit of the unknown. There is always something new to be discovered.

WHY GEMSTONES?

Other collecting hobbies tend to become rather repetitive after a time. A matchbox is much like any other matchbox, and the same goes for cigar bands and stamps and even butterflies and pressed flowers. But each individual mineral specimen has a character all of its own; and that is what makes a gemstone collection so fascinating. Besides, with more than 1 500 mineral families to track down in South Africa – let alone a high proportion of the 70 from which gemstones are produced – there can be practically no limit on a collection's potential.

One of the most exciting elements of gemstone collecting is the possibility of a really important discovery. Many such discoveries have been made by amateurs, and as mineralogy is still a young science there is a great deal of scope left. The discovery may amount to locating new deposits of really valuable stones, which can be exploited commercially; or to finding a single stone which produces unexpectedly beautiful effects when polished. Whichever the case, the hobbyist may expect a full measure of satisfaction for the efforts he puts in.

WHERE TO LOOK

As a general guide to the localities of gemstone deposits in southern Africa, there is nothing to beat the detailed geological maps produced by the South African Government Printer. Each of these deals with a particular area, and is accompanied by an explanatory text.

Lucky discoveries will often come to light in the course of a random stroll. In the arid and semi-desert regions which are traditionally the most fruitful source – if only because specimens are to be found simply lying on the bare surface – watch for veins and outcrops. In areas of higher rainfall which usually results in deep soil cover, concentrate on stream beds and road cuttings.

Though it is usually necessary to obtain permission first, try walking over mine dumps and through rock quarries, which are excellent sources of interesting specimens. In particular, specimens which have been left long on the surface may well have been damaged; whereas those brought up from a mine or recently exposed in a quarry will be in prime condition.

HOW TO COLLECT

Though not essential, it is helpful to have a range of equipment on hand for expeditions in search of specimens. It is, of course, possible to go looking for mineral specimens without equipment or preparation of any kind. But as with so many activities, the more you put in, the more you will get out. Try and study the area in advance, and work out which minerals may be expected and what signs will indicate their presence. As regards equipment, the most valuable tool is the prospector's pick, a modified stonemason's hammer with a probe at one end which is used to crack rocks open and trim down specimens. It is useful to have a stout knapsack to carry specimens; a few sheets of newspaper to wrap them up and prevent damage; pencil and paper to note down where they have been found; a magnifying glass to make a close inspection on the spot; and heavy gloves as the work may be rough. And as it is only too easy to lose the way, a compass is usually essential.

PREPARING SPECIMENS

Examine each specimen carefully and decide on its best points, then trim it into shape with a prospector's pick. As soon as possible enter all the relevant details about the specimen – a reference number, type, source, collector's name and date – in a catalogue you should keep for the purpose; and before losing track of it, drop a spot of enamel paint on the specimen itself, ideally in a spot where it will not be seen when on display, and when it is dry, ink in the reference number. With a little experience it is worth making a rather fuller record of specimens' physical characteristics, including their hardness, specific gravity, and streak and crystal form. When problems occur it is worth approaching professional geologists at a museum or university, and asking for their assistance and advice.

ENJOYING A COLLECTION

One of the first problems facing the beginner is the question of how to display specimens. He wants a method which is functional, not too expensive, flexible and compact, but at the same time attractive. The four principal means are:

(*a*) specimen boxes
(*b*) open shelving
(*c*) glass cases
(*d*) drawer cabinets

With shelves and cases, it is important not to overcrowd. The specimens should be arranged neatly and logically, but with an eye to the aesthetic possibilities that gemstones offer.

Besides merely keeping the specimens for their own sake, it is most rewarding to try cutting and polishing them at home, and making up pieces of jewellery. Many hobbyists enjoy taking pictures of their specimens, for they present great challenges when it comes to creating the best possible lighting effects. And yet others make pictures from the gemstones themselves – used as mosaics.

South Africa's gemstone industry is centred in Cape Town, while there are many thousands of enthusiastic gem hobbyists throughout the Republic.

COLLECTOR'S CHECKLIST

Date	Place	Gemstone	Crystal	Unpolished	Polished	Notes

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Date	Place	Gemstone	Crystal	Unpolished	Polished	Notes

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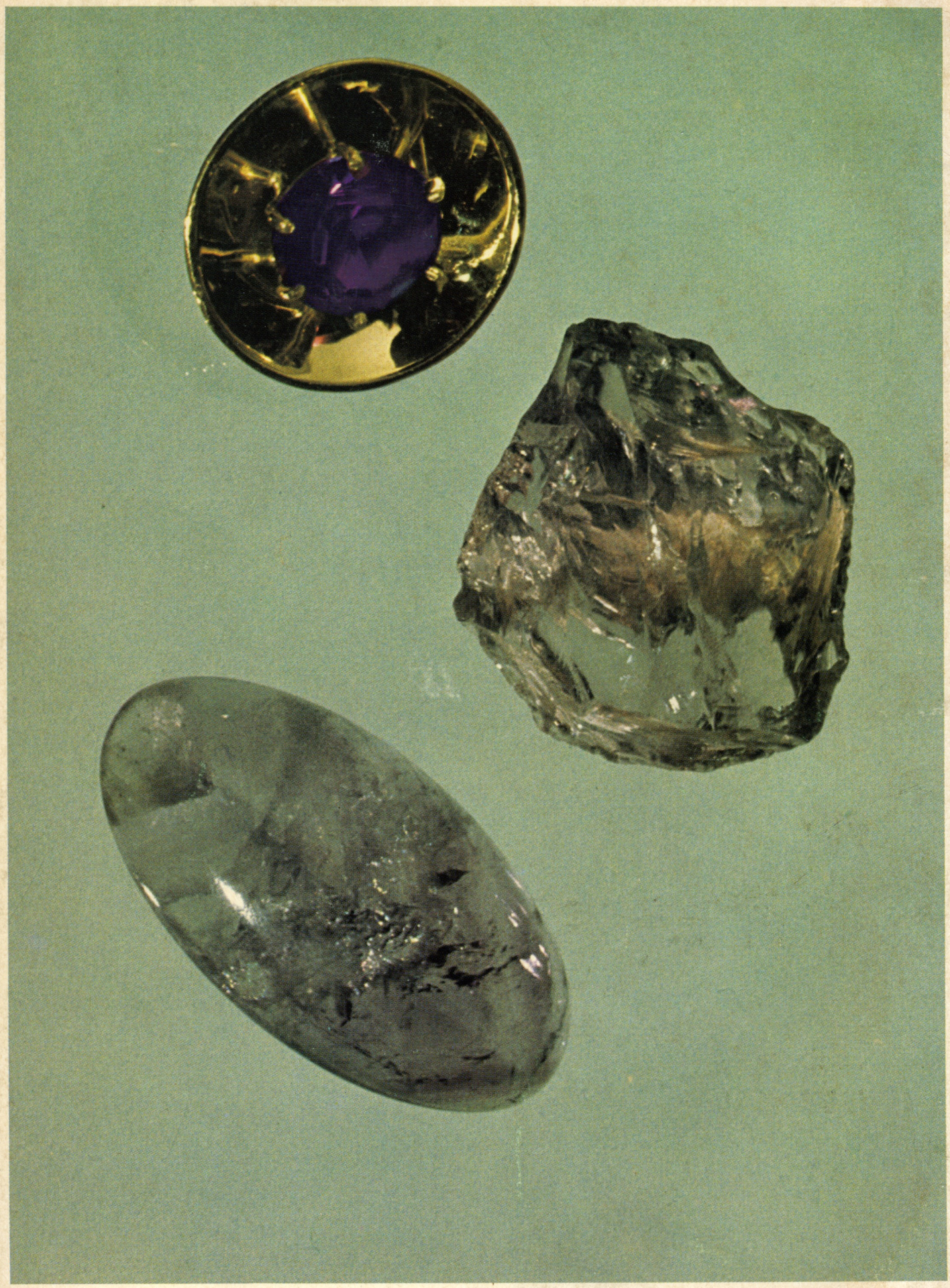
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